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press releases (3) without any of the nuance or caution in the original article. There is no doubt that the Holocaust experience was extremely stressful, and we completely agree that this exposure may be followed by profound physiological changes and psychological effects, as is also pointed out by Keinan-Boker et al. (1). However, we disagree that psychological stress per se is a promising candidate as a substantial cause of cancer.

Several studies have investigated the association between exposure to psychological stress and cancer, with stress characterized as likely having an effect over 1) a shorter period in part of the life, such as cancer in a child or death of a child (4); 2) the entire lifetime, as illustrated by “exposure” of your personality (5); or 3) related to occupational stress, as indicated by self-reported job strain (6). Results of these studies have not observed an association between any kind of psychological stress and cancer. These studies generally used administrative data to classify exposure status and thus avoided recall and information bias. Overall, misclassification of exposure and especially outcomes is largely absent in these studies. Finally, information on exposure status at study entry and follow-up is also complete. All these factors are of importance for the interpretation of the results presented by Keinan-Boker et al. (1). Furthermore, studies that adjusted for lifestyle variables indicate that any association between presumed stress exposure and a specific type of cancer appeared to be largely mediated by lifestyle and not by a direct link between the mind and physiology (7).

The hypothesis of a link between stress and cancer is fascinating, congruent with deeply entrenched cultural beliefs, and is easily invoked. Much of the apparent support for this link comes from studies like that of Keinan-Boker et al. (1) that do not directly test the hypothesis but nonetheless get invoked in creating an appearance of a wealth of empiric support.

We find the topic extremely important because most lay people would ascribe cancer to psychological stress, despite the fact that no sound epidemiological study has confirmed this hypothesis. The search for causes of cancer would benefit from putting aside any fascination with stress and other putative direct association

between the mind and physiology and pursuing associations with more definable and quantifiable factors such as measurable exposures as we know from lifestyle factors, social factors, or even climate conditions that could be directly investigated. To our knowledge, no study has shown that any psychological factor causes cancer and, to date, there is no convincing evidence that the psychological factors by themselves cause mutations or stimulate cells carrying mutations to proliferate. We propose that World War II survivors probably have a higher risk for cancer because of all other reasons mentioned in Keinan-Boker et al., except for psychological stress (1). A direct link between stress and cancer remains unsubstantiated, and Keinan-Boker et al. (1) have produced no data relevant to establishing such a link.

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Notes

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Re: Cancer Incidence in Israeli Jewish Survivors of World War II

Keinan-Boker et al. (1) conclude that Jewish European survivors of World War II are at increased risk for cancer and pose the hypothesis that this increased risk is due, in part, to extreme psychological stress they experienced. This conclusion is elaborated and amplified in an accompanying editorial (2) and in one of the Journal’s standard

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Dr Hursting declined to respond.

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